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EXAMINER
SUCHFIELD, GEORGE A

ART UNIT	PAPER NUMBER
3672	

DATE MAILED: 12/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/841,000	ROUFFIGNAC ET AL.	
	Examiner	Art Unit	
	George Suchfield	3672	

-- The MAILING DATE of this communication appears on th cover she t with th correspondenc address --

Peri d for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 October 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2193-2269 and 5396-5410* is/are pending in the application.

4a) Of the above claim(s) *2197,2198,2236 and 2237* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2193-2196,2199-2235,2237-2269 and 5398-5410* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *2193-2269 and 5396-5410* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *13 March 2002* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☒ Interview Summary (PTO-413) Paper No(s). *15* .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 5404-5410 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

No basis can be found in the original disclosure to support the process of new claim 5404 wherein heat is initially transferred to produce heated zones, from which heat is then transferred to form an "interconnected pyrolysis zone".

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 2193-2196, 2198-2235, 2238-2269, 5396-5403 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2193 and 2232 are deemed indefinite in that, in each claim, it is not clear whether the "one or more heaters" in line 3 refer to the "one or more heaters" in line 2, or are in addition thereto. This rejection could be overcome if the recitation in line 3 were amended to read -- the one or more heaters -- .

Claims 5399 and 5402 are deemed incomplete and therefore indefinite insofar as there is no step of initially establishing "a pyrolysis zone", as called for in lines 1 and 2 of the claims.

This rejection could be overcome, however, by, e.g., amending lines 1 and 2 of claims 5398 and 5402 to read -- wherein a pyrolysis zone is established in the part of the formation --,

5. Conflicts exist between claims of the following related ninety-one co-pending applications which includes the present application:

09/840,936; 09/840,937; 09/841,000; 09/841,060; 09/841,061; 09/841,127; 09/841,128; 09/841,129; 09/841,130; 09/841,131; 09/841,170; 09/841,193; 09/841,194; 09/841,195; 09/841,238; 09/841,239; 09/841,240; 09/841,283; 09/841,284; 09/841,285; 09/841,286; 09/841,287; 09/841,288; 09/841,289; 09/841,290; 09/841,291; 09/841,292; 09/841,293; 09/841,294; 09/841,295; 09/841,296; 09/841,297; 09/841,298; 09/841,299; 09/841,300; 09/841,301; 09/841,302; 09/841,303; 09/841,304; 09/841,305; 09/841,306; 09/841,307; 09/841,308; 09/841,309; 09/841,310; 09/841,311; 09/841,312; 09/841,429; 09/841,430; 09/841,431; 09/841,432; 09/841,433; 09/841,434; 09/841,435; 09/841,436; 09/841,437; 09/841,438; 09/841,439; 09/841,440; 09/841,441; 09/841,442; 09/841,443; 09/841,444; 09/841,445; 09/841,446; 09/841,447; 09/841,448; 09/841,449; 09/841,488; 09/841,489; 09/841,490; 09/841,491; 09/841,492; 09/841,493; 09/841,494; 09/841,495; 09/841,496; 09/841,497; 09/841,498; 09/841,499; 09/841,500; 09/841,501; 09/841,502; 09/841,632; 09/841,633; 09/841,634; 09/841,635; 09/841,636; 09/841,637; 09/841,638; and 09/841,639.

37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. The discussion below sets forth the Office's basis for its determination that each of these ninety-one applications contains at least one claim that conflicts with another one of the related co-pending applications identified above. Each of these ninety-one applications includes the same specification and collectively these applications present over five thousand claims. The Office has shown that each of these ninety-one applications contains at least one claim that conflicts with another one of the related co-pending applications identified above, and an analysis of each of five thousand+ claims in the ninety-one related co-pending applications would be an extreme burden on the Office requiring tens of thousands of claim comparisons. Therefore, the Office is requiring applicant to resolve the conflict between these applications and comply with 37 CFR 1.78(b) by either:

(1) filing a terminal disclaimer in each of the related ninety-one applications terminally disclaiming each of the other twenty-eight applications; or,

(2) provide a statement that all claims in the ninety-one applications have been reviewed by applicant and that no conflicting claims exist between the applications. Such a statement must set forth factual information identify how all the claims in the instant application are distinct and separate inventions from all the claims in the above identified ninety-one applications.

Applicant is reminded that obviousness-type double patenting analysis entails a two-step process: (1) the claims of this application and the other ninety-one applications must be construed; and (2) the claims of this application must be compared with the claims of the other applications to determine whether the differences in subject matter between the two claims render the claims patentably distinct. See Georgia-Pacific Corp. v. United States Gypsum Co., 195 F.3d 1322, 1326, 52 USPQ2d 1590, 1593 (Fed. Cir. 1999), and General Foods Corp. v. Studiengesellschaft Kohle, 972 F.2d 1272, 1279, 23 USPQ2d 1839, 1844 (Fed. Cir. 1992). As the Court of Customs and Patent Appeals (CCPA) explained: "[t]he fundamental reason for the rule [against"double patenting"] is to prevent unjustified timewise extension of the right to exclude granted by a patent no matter how the extension is brought about." In re Van Ornum, 686 F.2d 937, 943-44, 214 USPQ 761, 766 (CCPA 1982) (brackets and emphasis in the original) (quoting In re Schneller, 397 F.2d 350, 354, 158 USPQ 210, 214 (CCPA 1968)). Furthermore, the requirement will be held in abeyance until such time as the examiner indicates allowable subject matter. Examples of conflicts appear in the rejections here-in-below.

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321© may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 2193-2269, 5396-5410 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over copending applications (including the present application):

09/840,936; 09/840,937; 09/841,000; 09/841,060; 09/841,061; 09/841,127; 09/841,128; 09/841,129; 09/841,130; 09/841,131; 09/841,170; 09/841,193; 09/841,194; 09/841,195; 09/841,238; 09/841,239; 09/841,240; 09/841,283; 09/841,284; 09/841,285; 09/841,286; 09/841,287; 09/841,288; 09/841,289; 09/841,290; 09/841,291; 09/841,292; 09/841,293; 09/841,294; 09/841,295; 09/841,296; 09/841,297; 09/841,298; 09/841,299; 09/841,300; 09/841,301; 09/841,302; 09/841,303; 09/841,304; 09/841,305; 09/841,306; 09/841,307; 09/841,308; 09/841,309; 09/841,310; 09/841,311; 09/841,312; 09/841,429; 09/841,430; 09/841,431; 09/841,432; 09/841,433; 09/841,434; 09/841,435; 09/841,436; 09/841,437; 09/841,438; 09/841,439; 09/841,440; 09/841,441; 09/841,442; 09/841,443; 09/841,444; 09/841,445; 09/841,446; 09/841,447; 09/841,448; 09/841,449; 09/841,488; 09/841,489; 09/841,490; 09/841,491; 09/841,492; 09/841,493; 09/841,494; 09/841,495; 09/841,496; 09/841,497; 09/841,498; 09/841,499; 09/841,500; 09/841,501; 09/841,502; 09/841,632; 09/841,633; 09/841,634; 09/841,635; 09/841,636; 09/841,637; 09/841,638; and 09/841,639.

Although the conflicting claims are not identical, they are not patentably distinct from other. For example; claim 564, currently pending in S.N. 09/841,437 is an obvious variation of claim 2200 pending herein, and claim 565 currently pending in 09/841,437 is an obvious variation of claim 2239 pending herein. More specifically, both claim 564 and 2200 call for heating a section of a formation to increase the permeability to greater than about 100 millidarcy while controlling the pressure as a function of temperature, or controlling the temperature as a function of pressure; the precise extent of formation heated, i.e., a majority of the section or a majority of a portion of the section is deemed a matter of choice or design based on, e.g., formation characteristics or economic feasibility. Similarly, both claim 565 and 2239 call for heating a section of a formation to increase the permeability substantially uniformly while controlling the pressure as a function of temperature, or controlling the temperature as a function of pressure; the precise extent of formation heated, i.e., a majority of the section or a majority of a portion of the section is deemed a matter of choice or design based on, e.g., formation characteristics or economic feasibility.

It is further noted that claims 2193-2269, 5396-5410 are specifically not patentably distinct from claims 2193-2269 of applicant's copending application 09/841,284 because the hydrocarbon containing formation treated by the method of, e.g., claim 2193 or 5081 of this

pending application is deemed broad enough to encompass the coal formation of claim 2193 or 5317 of the copending application. Otherwise, the remaining claims of both this and the copending application appear to correspond, with the additional limitation in claims 5396 and 5397 to 20 heat sources per recovery well deemed an obvious matter of choice or design based on, e.g., the characteristics, properties and/or areal extent of particular hydrocarbon formation encountered in the field.

See MPEP 804.02 IV for a discussion of multiple double patenting rejections and the requirements for a single terminal disclaimer.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

8. Claims 2193-2196, 2200, 2203, 2205-2215, 2217, 2218, 2226, 2227, 2232-2235, 2238, 2239, 2242, 2244-2254, 2256, 2257, 2265, 5398-5405, 5407, 5408 and 5409 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ljungstrom (2,923,535).

Ljungstrom discloses a process for heating a hydrocarbon formation, which may comprise oil shale or coal, wherein the heat imparted causes volatilization, pyrolysis and gasification of hydrocarbon constituents, as well as causing an increase in permeability of such hydrocarbon formation (note col. 2, lines 1-24), as called for in claims 2193, 2232 and 5404. It is further deemed that such permeability increase will inherently or obviously be substantially uniform, as called for in claims 2232, 2227, and 5404, e.g. during an overall field heating process, as illustrated in Figures 2-5. Such permeability increase is deemed to necessarily or inherently encompass an increase to "greater than about 100 millidarcy" or "greater than about 5

Darcy", as called for in claims 2193, 2226, 2265; alternatively, to increase the permeability to greater than 100 millidarcy or 5 Darcy would have been an obvious matter of choice in order to ensure adequate fluid flow through the formation. It is further noted that claim 5404 is deemed to otherwise read on the embodiment of Ljungstrom (col. 3, lines 29-36) wherein during the operation of the first and second phases of the process (note col. 3, lines 8-29) heat transfer is effected from this process zone to heat an adjacent zone which effects both permeability increase and eventual pyrolysis of such adjacent zone.

As per claim 2194, 2233, in view of the large number of heat input wellbores or "sources", relative to a recovery wellbore (26), as illustrated in Figures 2-5 and 9, it is deemed at least some overlap or "superposition" of the heat applied will necessarily or obviously occur, especially in ensuring that the entire coal formation extent is heated – which appears necessary in order to provide the "exhaust channels" (40,42) in the coal or oil shale seam (col. 3, line 48 – col. 4, line 9) .

As noted above, pyrolysis clearly occurs in the hydrocarbon formation, as called for in claims 2195, 2234, 5398 and 5402.

As per claims 2200, 2239, 5409, Ljungstrom specifically discloses that the temperature "may be controlled depending on ... the pressure maintained or permitted to build up" (col. 2, lines 41-45). In addition, the temperature and pressure curves of Figures 10 and 11 appear to indicate a direct relationship between temperature and pressure within the coal formation.

As per claim 2203, 2242, 5180, at least a portion of the heating effected in Ljungstrom is effected "substantially by conduction", e.g., in the widening of the porous coal or oil shale layer (30) (see col. 3, lines 29-36).

Regarding claims 2205-2215, 2217, 2218, 2244-2254, 2256, 2257, 5408 it is deemed that the myriad hydrocarbon product mixtures recited in these claims would necessarily or obviously occur in carrying out the heating process of Ljungstrom, i.e., the precise composition of the product fluids is seen as dictated by the type of coal naturally occurring in the particular coal or oil shale formation actually encountered in the field. Moreover, it would be an obvious matter of choice to operate the Ljungstrom process to minimize what would be considered refinery contaminants, such as sulfur, nitrogen and/or oxygen in the product mixtures. Similarly, it would be obvious to reduce or minimize the amount of asphaltenes in the product mixtures for optimum downstream refining. Also, in the event that the particular coal or oil shale deposit encountered yields ammonia gas, it would be an obvious expedient to utilize it in a commercial process such as fertilizer production.

As per claims 5400, 5403, 5407, Ljungstrom disposes the heaters within "holes 20", with no apparent requirement that the holes or wellbores be cased or otherwise completed.

9. Claims 2202, 2204, 2219, 2222, 2228, 2229, 2241, 2243, 2258, 2261, 2266, 2267, 5396, 5397 and 5410 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ljungstrom (2,923,535).

The precise heating rate and/or thermal conductivity recited in claims 2202, 2241 and 5410 are deemed obvious matters of choice or design, especially in carrying out the embodiment in Ljungstrom of controlling and/or maintaining the temperature in the hydrocarbon formation within a specific operating range (col. 2, lines 25-48)

The thermal conductivity recited in claim 2204, 2243, 5181 is deemed an obvious matter of choice or design based on, e.g., the quality and type of the coal or oil shale formation present

and/or the matrix characteristics of the particular coal or oil shale formation encountered in the field.

The steps of 2219, 2222, 2228, 2258, 2261, 2266, such as controlling the heat or pressure in the formation, are deemed obvious matters of choice or design in carrying out the process of Ljungstrom, consistent with one of the overall objectives of Ljungstrom to control the heating process (col. 2, lines 25-55).

Regarding claims 2229, 2267, 5396 and 5397, Ljungstrom in the embodiment of Figures 2-5 and 9, discloses that myriad heating wellbores (20) may surround a production wellbore or shaft (26). The precise number of such heating wells provided, as called for in these claims, is deemed an obvious matter of choice or design in carrying out the process of Ljungstrom based on, e.g., the overall areal extent of the coal or oil shale formation(s) encountered in exploiting an actual reservoir encountered in the field.

10. Claims 2216, 2220, 2221, 2255, 2259 and 2260 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ljungstrom (2,923,535) as applied to claim 2193 above, and further in view of Tsai et al (4,299,285).

While Ljungstrom does not disclose the presence of hydrogen in a coal or oil shale heating production effluent, Tsai et al (col. 5, line 52 – col. 6, line 15) clearly discloses that gasification/volatilization products resulting from heating and/or gasifying a coal formation include hydrogen.

Accordingly, it is deemed that the volatilized/gasified coal production effluent produced in the process of Ljungstrom will obviously include a hydrogen component, as taught by Tsai et al, with the precise amount of hydrogen present, as called for in claims 2216, 2220, 2255, 2259,

5150, 5191, 5194, deemed an obvious expedient or matter of choice to one of ordinary skill in the art to which the invention pertains, based on, e.g., the actual intended use of the production effluent, such as a feed stream to a synthetic natural gas production facility or as process heat gas, as called for in claims.

As per claim 2221, and 2260 it would have further been an obvious expedient or matter of choice to monitor the production effluent of Ljungstrom for hydrogen content, especially since Ljungstrom makes specific reference to controlling the process based on, inter alia, 'the products desired' (col. 2, lines 42-44).

11. Claims 2216, 2220, 2221, 2223, 2224, 2256, 2259, 2260, 2262 and 2263 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ljungstrom (2,923,535) as applied to claim 2193 above, and further in view of Justheim (3,766,982).

Justheim'982 injects hydrogen into the heated hydrocarbon formation to hydrogenate the volatilized/pyrolyzed hydrocarbons evolved; and the hydrogen provided may further be obtained from production fluids obtained from the formation (col. 3, lines 1-9).

Accordingly, it would have been obvious to one of ordinary skill in the art to which the invention pertains, to similarly inject hydrogen into the heated coal or oil shale formation in the process of Ljungstrom, e.g., in the vicinity of the recovery wellbores, and provide the hydrogen from the production effluent, as taught by Justheim, in order to effect a partial hydroconversion/hydrotreating of the volatilized, pyrolyzed and/or gasified hydrocarbons prior to production in order to render the production effluent more suitable for further refining or above-ground processing/conversion, as called for in claims 2223, 2224, 2262 and 2263.

As per claims 2216, 2220, 2256 and 2259, in carrying out the injection of hydrogen into the coal formation to effect hydrogenation of the volatilized/pyrolyzed hydrocarbons evolved, in the modified process of Ljungstrom, the production fluids actually produced will necessarily or obviously include a partial pressure of hydrogen, with the precise amount thereof deemed an obvious matter of choice or design, based on, e.g., the particular coal or oil shale formation encountered.

As per claim 2221 and 2260, insofar as Justheim strives to control the amount of hydrogen present throughout the process to minimize "danger of accidental explosions", it would have been an obvious expedient or matter of choice to monitor the partial pressure of hydrogen at the production well(s) using conventional or commercially-available monitoring means, in carrying out the overall process of Ljungstrom, as modified by Justheim.

12. Claims 2225 and 2264 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ljungstrom (2,923,535) in view of Justheim (3,766,982) as applied to claim 2223 above, and further in view of Hoekstra et al (4,353,418) or Garrett (3,661,423).

It would have been obvious to one of ordinary skill in the art to which the invention pertains to further hydrogenate the partially-hydrogenated hydrocarbons produced from the heating process of Ljungstrom, as modified by Justheim'982, with hydrogen circulated or produced by the heating process of Justheim ,as taught by Hoekstra et al (note the Abstract and figure) or Garrett (col. 4, lines 50-54), in order to improve the overall quality or advance the refining/processing of the volatilized, pyrolyzed and/or gasified hydrocarbon fluids produced by the process of Ljungstrom, as modified by Justheim'982, by fully completing hydroconverting/hydrogenating refinement process.

13. Claims 2230, 2231, 2268 and 2269 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ljungstrom (2,923,535) as applied to claim 2193 above, and further in view of Salomonsson (2,914,309) or Camacho et al (4,067,390).

It would have been obvious to one of ordinary skill in the art to which the invention pertains to carry out the multiple well heating embodiment of Ljungstrom (Figures 2-5 and 9) by providing or laying out the wells in a triangle, and/or repeating triangle pattern, as disclosed by Salomonsson (note Figure 3 and col. 3, lines 5-34) or Camacho et al (note Figure 8) in order to enhance the overall heating/pyrolysis effected by optimizing well location.

14. Claims 2193-2195, 2200, 2202, 2203, 2219, 2226, 2227, 2230-2234, 2239, 2241, 2242, 2258, 2265, 2268, 2269, 5398, 5399, 5401, 5402, 5404, 5405, 5409 and 5410 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Pelofsky (3,882,941).

Pelofsky discloses heating an oil shale formation wherein over the course of heat injection, shut-in and production cycles, the oil shale formation will experience "a marked increase in permeability" (col. 2, lines 39-68). It is deemed that such permeability increase will inherently or obviously be substantially uniform, as called for in claims 2232, 2227 and 5404, insofar as the entire oil shale formation extent appears affected by the heating and shut-in cycles. Such permeability increase, i.e., the precise degree or amount of permeability increase effected, such as 100 millidarcy or 5 Darcy, as called for in claims 2193, 2226 or 2265, is deemed to inherently or obviously occur in the process of Pelofsky based on or dictated by, e.g., the characteristics, such as kerogen content, of the oil shale actually encountered in the field.

As per claims 2194, 2233, Figure 2 and col. 4, lines 21-50; col. 5, line 58 - col. 6, line 14 are particularly relied upon wherein overlapping or superimposed heat is provided to an oil shale deposit in order to increase the heating effect thereby enhancing the pyrolysis of the oil shale to kerogen.

As per claims 2195, 2234, 5399 and 5402, Pelofsky clearly maintains the temperature in a pyrolysis range, i.e., sufficient to convert the kerogen into bitumen.

As per claims 2200, 2239 and 5409, it is noted that Pelofsky controls the pressure or temperature during the cyclic phases of the heating process, i.e., the hot fluids injection and shut-in are based on pressure measurements and control in early cycles, followed by temperature measurements and control in later cycles. It is deemed that the pressure and temperature within the oil shale deposit are each inherently or obviously related and controlled relative to the other during the Pelofsky process (note col. 3, lines 9-67) since the temperature input or increase to the deposit is limited by the pressure buildup, and the eventual effect of the temperature increase is to render the deposit more permeable thus effecting the operating pressure within.

The process steps of claims 2202, 2241, and 5410 are deemed inherently or obviously carried out by Pelofsky which, by virtue of carrying out the heating in stages, i.e., injection, then shutting-in the well, necessarily or obviously provides a relatively slow rate of heating.

Regarding claims 2203 and 2242, insofar as Pelofsky observes that the oil shale deposit possesses an initial permeability of "usually essentially zero" (col. 2, lines 47-50), it is deemed that at least some phase of the overall oil shale heating will inherently or obviously be "substantially by conduction".

As per claims 2219 and 2258, insofar as Pelofsky operates the process by controlling pressure around 50 psi above formation or deposit pressure, it inherently or obviously controls the pressure at least 2.0 bar.

As per claims 2230, 2231, 2268 and 2269, the well pattern illustrated in Figure 2 of Pelofsky clearly comprise three or more heat sources and could be construed as comprising a "triangular" pattern, as broadly recited in these claims.

15. Claims 2204 and 2243 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pelofsky (3,882,941)

The thermal conductivity recited in claims 2204 and 2243 is deemed an obvious matter of choice or design based on, e.g., the quality and amount of the kerogen present and/or the matrix characteristics of the particular oil shale formation encountered in the field.

16. Claims 2230, 2231, 2268 and 2269 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pelofsky (3,882,941) as applied to claim 412 and 452 above, and further in view of Salomonsson (2,914,309).

It would have been obvious to one of ordinary skill in the art to which the invention pertains to carry out the multiple well heating embodiment of Pelofsky (as per Figure 2) by providing or laying out the wells in a triangle, and/or repeating triangle pattern, as disclosed by Salomonsson (note Figure 3 and col. 3, lines 5-34) in order to enhance the overall heating/pyrolysis effected by optimizing well location.

17. Claims 2193-2196, 2200, 2202, 2205-2218, 2226-2228, 2232-2235, 2239, 2241, 2244-2257, 2265, 2266, 5398-5405 and 5407-5410 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sresty et al (4,485,869).

Sresty et al (note col. 3, line 53 – col. 4, line 22) disclose a process for heating a hydrocarbon formation utilizing a plurality of electrical heaters or electrodes (12,14,16) positioned within the formation. Uniform heating is imparted to the part or section of the formation bounded by the electrodes (note heating zone 28 of Fig.1). It is further disclosed that the heating is effected uniformly within the part of the formation, which results in an accompanying increase in the permeability of such part or section of the formation.

Insofar as the heating is applied uniformly to the hydrocarbon formation, as noted, it is deemed that the accompanying increase in the permeability of such formation interval or part (note col. 7, lines 23-40; col. 9, lines 23-58) will inherently or obviously occur uniformly, commensurate with the heating by the electrical heaters or electrodes (12,14,16), as called for in claims 2196, 2227, 2232, 2235 and 5404.

As per claim 2193, 2226, and 2265, Sresty et al (Figure 7 and col. 10, lines 16-41) clearly indicates that such uniform heating of the part or portion of the oil shale formation, such as formation section (28) may increase the permeability to in excess of 4600 millidarcies. Such permeability increase is deemed to necessarily or inherently encompass an increase to "greater than about 100 millidarcy" or "greater than about 5 Darcy", as called for in claim 2193, 2226 and 2265 alternatively, to increase the permeability to greater than 100 millidarcy or 5 Darcy would have been an obvious matter of choice in order to ensure adequate fluid flow through the oil shale formation.

As per claims 2194, 2233, it is deemed that at least some overlap or superposition of the heating yielded by the electrical heaters will inherently or obviously occur, due to, e.g., the close proximity of such heaters, as illustrated in Figures 1 and 3.

As per claims 2195, 2234, 5399 and 5402, Sresty et al effects pyrolysis in the heated formation section (28) and maintains the temperature within a pyrolysis temperature range.

As per claims 2200 and 2239, Sresty et al clearly controls the pressure within the part or section of the formation bounded by the electrodes by controlling the temperature within such formation part or section, e.g., the buildup of high gas pressures with the formation section (28) is avoided by heating between a limited temperature range (note col. 3, line 53 – col. 4, line 22).

As per claims 2202, 2241 and 5410, note that the exemplary heating rates set forth in Sresty et al (col. 10, lines 3-41), such as less than 0.2oC per hour are clearly below the ranges in these claims of less than about 10oC per day.

Regarding claims 2205-2218, 2244-2257 and 5408, it is deemed that the myriad hydrocarbon product mixtures recited in these claims would necessarily or obviously occur in carrying out the in situ oil shale heating process of Sresty et al, i.e., the precise composition of the product fluids is seen as dictated by the particular kerogen naturally occurring in the particular oil shale formation actually encountered in the field. Moreover, it would be an obvious matter of choice to operate the Sresty et al process to minimize what would be considered refinery contaminants, such as sulfur, nitrogen and/or oxygen in the product mixtures. Similarly, it would be obvious to reduce or minimize the amount of asphaltenes in the product mixtures for optimum downstream refining.

Also, in the event that the particular crude oil deposit encountered yields ammonia gas, it would be an obvious expedient to utilize in a commercial process such as fertilizer.

As per claim 2228, and 2266, as illustrated in Figure 8, and as indicated in col. 12, lines 1-32, the heating process is carried out until "substantially all the hydrocarbonaceous liquids are

recovered". Thus, the "condensable hydrocarbons" recovered are deemed to be inherently or obviously at least 60% and above the Fischer Assay value.

As per claims 5400 and 5407, the electrical heaters or electrodes (12,14,16) in Sresty appear to be deployed in uncompleted or open wellbores.

18. Claims 2204, 2219, 2243 and 2258 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sresty et al (4,485,869).

The thermal conductivity recited in claims 2204 and 2243 is deemed an obvious matter of choice or design based on, e.g., the quality and amount of the kerogen present and/or the matrix characteristics of the particular oil shale formation encountered in the field.

As per claims 2219 and 2258 Sresty et al also controls the pressure within the heating zone (28) of the oil shale formation by their step of heating the formation "under confining gas pressure" (col. 12, lines 1-32). The recited pressure range of greater than 2.0 bar absolute is deemed an obvious matter of choice or design based on, e.g., the quality and amount of the kerogen present and/or the matrix characteristics of the particular oil shale formation encountered in the field.

19. Applicant's arguments filed with the amendment have been fully considered but they are not persuasive.

Applicant's remarks regarding the comparison of allowed claims is noted, however a terminal disclaimer would still be required in order to overcome the obviousness double patenting rejection based on the "sister" application, S.N. 09/841,284, for treating coal.

Applicant's arguments against Ljungstrom (2,923,535) are not deemed persuasive. In col. 2, lines 1-25, Ljungstrom clearly indicates that the electrical or first heating phase will result

in "the preheated stratum becoming permeable", and makes additional reference to the stratum now being "porous", such that gaseous medium can now be "introduced to the permeable stratum desirably. Further, the hydrocarbon formation heated by the electrical heaters (22) is rendered sufficiently permeable such that the products of vaporization and pyrolysis can flow and be removed "at a zone spaced laterally from that where the combustion medium was introduced". Overall, Ljungstrom heats a "relatively impermeable" hydrocarbon formation with a plurality of electrical heaters which both heat and render the formation sufficiently permeable such that an in situ combustion phase may be carried out involving oxidant or gaseous medium injection and spaced recovery of the hydrocarbon effluent. By virtue of the precise pattern of electrical heaters deployed, and noting no indication otherwise, it is deemed that the permeability effected will be uniform throughout the heated region - into which combustion supporting gaseous medium can be then be injected .

Further in this regard, it is noted that applicant invites the examiner to provide a reference(s) or affidavit to support myriad assertions in the rejection as per MPEP 2144.03. It is not seen that such section of the MPEP was invoked. Instead, it is deemed that MPEP Sections 2144.02, and particularly Section 2144.05, are more "relied upon". However, it has been observed that one of the references cited of record to Ware et al (4,691,771), in their discussion of the prior art or state of the art (col. lines 30-40), observe that formations of less than 100 millidarcy are normally characterized or deemed in the art as being of "low permeability" such that fluids, such as steam or a combustion-supported gaseous medium could not be injected without incurring unacceptably high injection pressures and unwanted or uncontrolled fracturing of the formation with resulting fluid bypass occurring. Since, however, Ljungstrom, as noted

above, discloses that the formation is rendered sufficiently permeable by the electrical heating phase to then allow the subsequent in situ combustion phase to be successfully carried out, it must, i.e., inherently, possess a permeability "greater than 100 millidarcy", as defined by the state of the art observation of Ware et al. Also, in view of the noted disclosure of Ljungstrom, the burden appears to now fall on applicant, as per MPEP Section 2144.05, to indicate how the said range of "greater than 100 millidarcy" patentably distinguishes over Ljungstrom under 35 USC 103 , e.g., by some showing of criticality or unexpected results.

With respect to claims 2202, 2241 and 5410, Ljungstrom discloses controlling or maintaining the temperature within a specific operating range (col. 2, lines 25-48); it would have been an obvious expedient to effect such temperature control, at least in part by controlling the heating rate to the level recited. The formula depicted in these claims appears to comprise a common power relationship based on major formation characteristics with no criticality or unexpected results observed for the recited average heating rate of 10oC/day. Ljungstrom also indicates that some pyrolysis may occur during the electrical heating phase (col. 4, lines 21-35).

Contrary to applicant's arguments regarding the thermal heat conductivity imparted by claims 2204, 2243, it is deemed one skilled in the art would expect adequate heat conductivity and thermal diffusivity would occur in the process of Ljungstrom which is based in large part on heat transfer both into the formation from the heaters, and subsequently from such heated formation section to adjacent formation interval, as disclosed as the expansion of heated formation to the outlines (32) and (42) illustrated in Figures 2-5. Accordingly, the recited thermal conductivity would inherently or obviously occur in Ljungstrom since the formation

appears heated in the same manner, and for the same purpose, as per applicant's claimed invention.

Contrary to applicant's arguments, Ljungstrom makes repeated and frequent references to controlling the temperature, controlling the pressure, maintaining a temperature range (note col. 2, lines 25-48 and the example in cols 4-5).

With respect to claims 2222, 2261, and 5408, it is deemed that Ljungstrom both alters or controls the pressure and avoids the production of hydrocarbons having carbon numbers greater than 25. In this regard, it is known, as per petroleum or organic chemistry, that such hydrocarbons comprise wax component. Since Ljungstrom (note col. 2, lines 25-48) makes frequent reference to "valuable products" and "desirable products of oil vaporization and pyrolysis", and recovers the hydrocarbon effluent in the vapor phase, it is deemed that Ljungstrom inherently or obviously also inhibits or avoids the production of hydrocarbons having carbon numbers greater than 25.

With respect to claims 2228 and 2266, insofar as the coal or oil shale formation is heated through at least two operational phases, as noted above, along with a specific well pattern(s) to ensure complete exploitation of the formation, it is deemed that applicant's recited conversion/recovery extent of 60% by weight of condensable hydrocarbons, as measured by the Fischer Assay, will inherently or obviously be effected by the Ljungstrom process.

With respect to the claims 2229, 2267, 5396 and 5397, it is noted that Ljungstrom is not limited to the use of 6 heaters per production well, but merely sets forth such well arrangement as an example: "Electrical heating elements 22 may be arranged ... in groups comprising six elements about a common gas exhaust passage 26". Contrary to applicant's arguments, it is not

seen where applicant discloses that the use 7 or more heaters provides any unexpected results over Ljungstrom, and it is deemed that one skilled in the well art would similarly be concerned with "desired product composition ... production rates, desired heating rates" in order to optimize or tailor the Ljungstrom process to a particular oil shale or coal formation. In fact, Ljungstrom, as noted previously, is specifically directed to recovery of "valuable products".

With respect to the combination of Ljungstrom and Tsai et al (4,299,285), as applied to claim 2216+, it is not seen that any particular error in such combination has been pointed out by applicant.

Similarly, no particular argument or error in the combination of Ljungstrom with Justheim et al (3,766,982), Hoekstra et al (4,353,418) and/or Garrett (3,661,423) has been pointed out by applicant.

With respect to the combination of Ljungstrom and Salomonasson (2,914,309) or Camacho et al (4,067,390), it is noted again that the well arrangement illustrated in Ljungstrom is exemplary only. Hence, one skilled in the art is not deemed precluded from deploying the well known and conventional well pattern arrangements of Salomonasson or Camacho et al, based on, e.g., routine experimentation or formation characteristics and extent, as actually encountered in the field.

Applicant's arguments against Pelofsky (3,882,941) are not deemed persuasive. Contrary to applicant's arguments regarding claims 2193, 2232 and 5404, the claims, as amended, do not require the heaters to be in the formation or wellbore(s). Accordingly, it is deemed that a "heater" would be inherently or obviously be utilized by the process of Pelofsky in order to provide the hot fluids for injection. This rejection, as well as other rejections based on Pelofsky,

could be overcome if the independent claims 2193 and 2232 (and 5404?) were amended to indicate that the "one or more heaters" are -- disposed in the formation -- (and clearly indicating only a single "one or more heaters" included, as noted above).

With respect to claim 2226, it is not seen that the said range of "greater than about 5 Darcy" patentably distinguishes over the "marked increase" in permeability provided by the process of Pelofsky, e.g., by some showing of criticality or unexpected results.

With respect to claim 2227, Pelofsky (col. 4, lines 59 – col. 5, line 2) indicates that after the permeability increase in the oil shale formation is effected, then conventional "secondary and even tertiary recovery processes may be used". It is deemed that such processes would not be suggested by Pelofsky unless uniform permeability was inherently or obviously provided by the heating process of Pelofsky.

Applicant's arguments against the rejection of claims 2194 and 2233 are not well taken insofar as Pelofsky explicitly discloses superposition of heat from a plurality of heaters, as illustrated in Figure 2.

Similarly, with respect to claims 2200 and 2239, Pelofsky clearly controls the pressure based on, or as a function of temperature, i.e., high pressure fluids are injected and maintained until the measured temperature in the formation reaches greater than 50oF above the transition temperature of the oil shale.

With respect to claims 2202, 2241 and 5410, Pelofsky discloses controlling the temperature in each treatment phase while, overall, not permitting the average temperature to exceed 900oF within a specific operating range (col. 4, lines 45-49); it would have been an obvious expedient to effect such temperature control, at least in part by controlling the heating

rate to the level recited. The formula depicted in these claims appears to comprise a common power relationship based on major formation characteristics, with no criticality or unexpected results observed for the recited average heating rate of 10oC/day.

As noted in the rejection, the well arrangement illustrated in Figure 2 of Pelofsky could be construed as comprising "triangles" defined by groups of 3 wells each, as broadly recited in claims 2231 and 2269.

Contrary to applicant's arguments regarding the thermal heat conductivity imparted by claims 2204, 2243, it is deemed one skilled in the art would expect adequate heat conductivity and thermal diffusivity would occur in the process of Pelsoky in order for the heat transfer and control to occur in the precise cyclical manner set forth. Accordingly, the recited thermal conductivity would inherently or obviously occur in Pelosky with any variation thereof dictated by the characteristics of the particular oil shale formation encountered.

With respect to the combination of Pelofsky and Salomonsson, as applied to claim 2230, 2231, 2268 and 2269, it is not seen that any particular error in such combination has been pointed out by applicant.

Applicant's arguments against the reference to Sresty et al (4,485,869) are not deemed persuasive. The permeability increase imparted to the hydrocarbon formation is clearly effected by electrical heaters comprising the electrodes (12,14,16).

20. It is noted that claims 2199, 2201, 2238, 2240 and 5406 have been rejected only on the grounds of double patenting and/or 35 USC 112(2).

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Suchfield whose telephone number is 703-308-2152. The examiner can normally be reached on M-F (6:30 - 3:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bagnell can be reached on 703-308-2151. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7687 for regular communications and 703-305-7687 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

George Suchfield
Primary Examiner
Art Unit 3672

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December 23, 2002